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(54) Title: AUCTION MARKET WITH PRICE IMPROVEMENT MECHANISM
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(57) Abstract

A system for auctioning financial products (20) over a distributed, networked computer system includes a plurality of workstations for entering orders for financial products into the distributed, networked computer system. The order specify a price for the financial product, a quantity of the financial product and exposure time which the order can remain active. The system also includes a plurality of workstations for entering predefined relative indication and responses for orders for the product. The predefined relative indication specify a willingness to trade. The responses specify a price and quantity. The system includes a server computer coupled to the workstations for entering the orders, predefined relative indications, and the responses, with server computer executing a server process that for a first one of said orders, determines a match to said first order with the predefined relative indications, responses and contraside orders during an interval determined by the exposure time specified by said first order.

(57) Abrégé

La présente invention concerne un système de mise aux enchères de produits financiers (20) via un système informatique distribué, en réseau comprenant une pluralité de stations de travail permettant l'introduction dans le système informatique distribué en réseau d'ordres se rapportant à des produits financiers. L'ordre mentionne un prix du produit financier, une quantité du produit financier, et une durée d'ouverture pendant laquelle l'ordre reste valable. Le système comporte également une pluralité de stations de travail permettant la fourniture d'indications relatives définies et de réponse pour les ordres se rapportant au produit. L'indication relative définie mentionne une volonté d'entrer en affaires. Les réponses précisent un prix et une quantité. Le système comprend un ordinateur serveur couplé aux stations de travail permettant la fourniture des ordres, d'indications relatives définies et de réponse. En l'occurrence, l'ordinateur serveur exécute un processus serveur qui détermine pour le premier des ordres s'il y a concordance avec ledit premier ordre, les indications relatives définies, les réponses et les ordres en contre pendant un intervalle de temps déterminé par la durée d'ouverture spécifiée par le premier ordre.

PCT

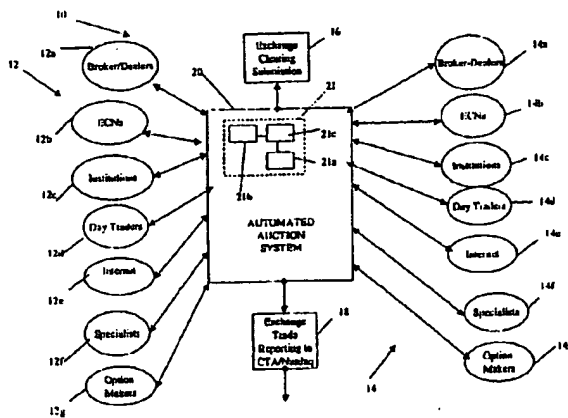
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(54) Title: AUCTION MARKET WITH PRICE IMPROVEMENT MECHANISM



(57) Abstract

A system for auctioning financial products (20) over a distributed, networked computer system includes a plurality of workstations for entering orders for financial products into the distributed, networked computer system. The order specify a price for the financial product, a quantity of the financial product and exposure time which the order can remain active. The system also includes a plurality of workstations for entering predefined relative indication and responses for orders for the product. The predefined relative indication specify a willingness to trade. The responses specify a price and quantity. The system includes a server computer coupled to the workstations for entering the orders, predefined relative indications, and the responses, with server computer executing a server process that for a first one of said orders, determines a match to said first order with the predefined relative indications, responses and contraside orders during an interval determined by the exposure time specified by said first order.

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Description

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AUCTION MARKET WITH PRICE IMPROVEMENT MECHANISM

BACKGROUND

This invention relates to an automated auction system for trading products such as equity securities.

There are known auction processes. One type of auction process is a live auction used to trade antiques or paintings, for example. Other auctions include live auction processes for financial instruments such as, for example, futures contracts, and for equities in a stock exchange. Examples of live auction processes for stocks include the New York Stock Exchange® (NYSE) or the American Stock Exchange® (AMEX).

On the NYSE and AMEX, for example, orders to buy and sell generally are not executed with an automated process. Instead, a person called a "specialist" stands in front of a crowd, taking orders from the crowd and tries to match the orders with other participants in the crowd, his own account, or sends them to other market centers. While many of the tools a specialist uses to receive orders and record and report final trades are automated, the executions themselves, including the decisions and processes to execute, are overseen in a manual manner. This is in contrast to automated markets, such as the Nasdaq Stock Market, where executions often take place without human intervention. The Nasdaq Stock Market® is an example of an electronic negotiated market involving dealers that negotiate a trade for a security for their own account or for that of a client. Transaction recording and reporting in the NYSE and AMEX exchanges and The Nasdaq Stock Market are generally automated.

Other types of auctions are so called "call" or "periodic" auctions such as the Arizona Stock Exchange and the OptiMark™ trading system. In these types of auctions, orders are matched only at specified times

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5 during the day.

SUMMARY

10 According to an aspect of the invention, a
5 method of auctioning products over a distributed
networked computer system is provided. The method is
executed over the system and includes entering an order
for a product. The order can specify a price. The
15 price can be a fixed price, a relative price or a market
price. The order also specifies a quantity and an
exposure time. The process also includes entering a
response to an order, the response specifying a price,
20 price improvement, and quantity and matching the order
with the response in accordance with the exposure time
specified by the order.

25 According to an additional aspect of the
invention, a method can include entering pre-defined
relative indications that correspond to a willingness to
buy or sell the product and wherein the pre-defined
30 relative indications specify a price relative to a
current market price.

35 According to an additional aspect of the
invention, a method of auctioning financial products
over a distributed, networked computer system includes
25 entering orders for financial products into the
distributed, networked computer system, said orders
specifying a price for the financial product, a quantity
of the financial product and exposure time which the
40 order can remain active and entering responses to orders
for the product, said responses specifying a price and
quantity. For a first one of the orders, matching said
45 first order to the responses and contra-side orders,
during an interval determined by the exposure time
specified by said first order, and expiring the first
35 one of the orders if no matching responses or others of

said orders are received during the exposure period.

According to an additional aspect of the invention, a computer program product for auctioning products, the computer program product residing on a computer readable medium comprising instructions for causing a computer to receive an order that was entered for a product, the order specifying price, quantity and exposure time and receive a response that was entered in response to an order, the response specifying a price, price improvement, and quantity. The program also includes instructions to match the order with the response during the exposure time specified by the order.

According to an additional aspect of the invention, a system for auctioning financial products over a distributed, networked computer system includes a plurality of workstations for entering orders for financial products into the distributed, networked computer system. The orders specify a price for the financial product, a quantity of the financial product and exposure time which the order can remain active. The system also includes a plurality of workstations for entering responses to orders for the product. The responses specify a price and quantity. The system includes a server computer coupled to the workstations for entering the orders and the responses, with the server computer executing a server process that, for a first one of said orders, determines a match to said first order with the responses and others of said orders during an interval determined by the exposure time specified by said first order.

One or more of the following advantages may be provided by aspects of the invention. The auction process is active when an order is presented to the system. Thus, unlike the auction markets with physical

5 trading floors and crowds, the auction process and
system of the present invention provides complete
automation for both access and execution for
transactions. An auction is available anytime an order
10 5 arrives in the system. The order can be immediately
matched with a contra side order if available, instead
of having to wait until a specified time of day or
interval to elapse.

15 Entries to match against an order in the
10 auction system can include fixed price, relative price
and predefined relative indications. Responses which
are entered in response to entry of an order can have a
20 lifespan but preferably responses have no lifespan, that
is, they are either immediately matched or canceled.

15 The entity entering the responses can choose
25 what types of orders to respond to. For example, there
are two broad types of orders, public agency orders,
e.g., a retail customer, or institutional customer and
professional orders, e.g. professional traders or broker
30 20 dealers trading for their own account. There are
corresponding types of responses, public responses and
professional responses. Often persons who enter public
responses may not want to deal with professional traders
35 since the professional traders may have more knowledge
25 concerning order flow, volume and so forth. This system
allows them to select the type of order to respond to.

40 The auction system permits the use of pre-
defined relative indications. A pre-defined relative
indication, therefore, is a willingness or an expression
30 to trade that resides in the system and remains dormant
and unseen by other participants. This mechanism also
45 allows trading interest to remain anonymous as to price,
size and identity. A pre-defined relative indication,
when activated, becomes a response that is priced
35 50 relative to a standard reference quote, e.g., the

National Best Bid/offer (NBBO).

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram of an auction system.

FIGS. 2-8 are block diagrams of auction examples.

FIGS. 9A-9C are flow charts showing entry formats for orders, responses and pre-defined relative indications.

FIGS. 10A-10C are flow charts showing the auction process used in the system of FIG. 1.

FIG. 11 is a flow chart showing a pre-defined relative indication queue ordering process.

FIG. 12 is a flow chart of a response match process used in the process of FIGS. 10A-10C.

DESCRIPTION

Referring now to FIG. 1, a networked auction system 10 designed to facilitate trading of products such as real property, personal property, and financial property such as equity securities and/or other financial instruments such as bonds, options, futures, and so forth is shown. The networked auction system 10 will be described in terms of a system and process in which financial instruments such as stocks are auctioned. Any product could be auctioned particularly if the product has a value or price that can vary over short periods of time.

The networked auction system 10 includes an order entry side 12 comprised of any/all of broker/dealer systems 12a, electronic communication network (ECN) systems 12b and public participant systems 12c that enable members of the public to participate in the networked auction system 10 either directly, via

the Internet, or indirectly, via the Internet or another communication medium, through a sponsor such as a broker/dealer. Each of the systems 12 allow the various participants to enter orders into an automated auction system 20. The order entry portion 12 of the networked auction system 10 can also include day trader systems 12d, institutional systems 12e, exchange specialists 12f, and option market makers 12g.

The networked auction system 10 also includes an order response side 14. The order response side 14 can include the same participants including broker/dealer systems 14a, ECN systems 14b, Internet based participant systems 14c, either direct or sponsored, day trader systems 14d and institutional systems 14e and exchange specialists 14f, and option market makers 14g. The responders can use the same physical system as is used to enter orders except the responders would use an order response process. These systems 14 may be referred to herein as the "crowd."

With these order response systems 14, when an order is presented, via the order entry systems 12a-12g, any one or more of the order response systems 14a-14g can respond to the order. Whichever order response system 14 responds first to the order and meets or exceeds the terms of the order will result in a match for execution.

The response systems 14a-14g can also enter pre-defined relative indications (described below) that express a participant's willingness to trade. Each of the order entry systems 12a-12g and order response systems 14a-14g are representative of types of trader systems and, in fact, in any practical example of such a system, there could be many hundreds, thousands, etc. of any one type or other types of order entry and order response systems.

5 The order entry systems 12 or the order
response systems 14 can be workstations. The
workstations can have an interface to communicate with
the automated auction system 20. Alternatively, the
10 5 workstations can have an application program interface
that is developed to interface with the automated
auction system 20 or the Financial Information Exchange
protocol customized to the auction system 20.

15 The automated auction system 20 includes at
10 least one server system 21 including a process 21a that
is coupled to the order systems 12 and response systems
14 via a network (not shown) parts of which can be
20 proprietary networks and parts of which can be the
Internet. The server system 21 executes a server
15 process 100 (FIGS. 10A-10C) that is stored on a storage
medium 21b and which is executed in computer main memory
25 216 that is part of the server 21. The auction system
20 also is coupled to an exchange clearing submission
system 16 and an exchange trade reporting system 18.

30 20 The automated auction system 20 submits exchange
clearing submissions to the clearing system 16 and
reports execution of trades to the reporting system 18.

35 Trade reporting is accomplished for every execution,
(e.g. within 90 seconds of the execution of the trade),
25 so that the trade can be reported for dissemination to
vendors of market news, i.e., news outlets, and so
forth. The reporting system 18 is a Securities and
40 Exchange Commission (SEC) or other regulatory approved
or authorized process through which all trade reports in
30 public securities are disseminated, i.e., the
Consolidated Tape Association (CTA) for exchange-listed
45 stocks, and through the NASD/Nasdaq for Nasdaq-listed
stocks.

50 The automated auction system 20 can be a
35 facility of a stock exchange, a market or a self

5 regulatory organization (SRO). As a facility of an SRO
which may include an exchange or market, every trade
that is executed in the automated auction system 20 is
given to the SRO so that the SRO can report the trade
10 5 and perform other regulatory and clerical operations.

The automated auction system 20 matches orders
with responses, other orders, and pre-defined relative
indications of willingness to trade. Once an order is
15 10 matched to a response, another order, or pre-defined
relative indication, the match is considered a
preliminary execution in the automated auction system
20. The preliminary execution is given to the market or
20 20 exchange, as appropriate, so that the preliminary
execution can be validated. If the preliminary
15 25 execution is a good execution, it is validated and
forwarded to a clearing corporation for clearance and
settlement. For example, the exchange can validate that
it is a good execution, consistent with the rules of the
SRO and the Securities Exchange Commission (SEC) or
30 20 equivalent regulatory authority and that there are no
existing orders that could have been executed or that
none of the parties are suspended from trading, and so
forth. The exchange trade clearing 16 and reporting 18
35 25 are, in general, conventional, the manner that the
automated auction system 20 would interface to the
exchange trade clearing 16 and reporting 18 could be
specified by the those systems.

40 Each order in the automated auction system 20
has a life span. The maximum life span of an order is
30 30 determined by the order entry side 14 of the auction 10.
The life span can be variable and can be any set time
45 45 period. Fixed time periods are preferred for trading
financial securities such as stocks. Exemplary fixed
time periods are a 15 second order, a 30 second order or
35 50 a 0 second order. The fixed time periods can be chosen

5 taking into consideration the nature of the product that
is being traded, any regulatory rules that are imposed
on trading the product, as well as, the nature of the
market activity. For a financial instrument such as
10 5 stocks, regulatory rules are generally very important in
determining time periods. Other times may be used even
for financial instruments based on changes in regulatory
rules. At the instant of order entry, an order is
15 exposed to the crowd for the exposure time specified in
the order. However, an execution can always end the
20 auction sooner, as will be described below.

Aspects of the auction system rely upon
20 relative prices. These prices are relative to a
standard, variable market price. One standard pricing
15 mechanism used in the auction system 10 when auctioning
stocks is The National Best Bid/offer (NBBO). The NBBO
25 is a standardized quote in the securities industry for
the national market systems best consolidated quotation.

The National Best Bid/Offer is a quantifiable price to
30 20 buy and sell. The NBBO is always changing and could
change during the life of an order having an impact on
the final price. The relative pricing mechanism uses
the NBBO and a price improvement "pi" to produce relative
35 prices. The "pi" enables an order to achieve the best
25 price in the market at the current time. The provision
of the price improvement relative to the NBBO or other
standard market quote would tend to improve the
40 execution price relative to the spread, i.e., the
difference between bid and offer prices for any product
30 or security. It also facilitates decimal denominated
trading by enabling small price improvements of one (1)
45 cent or even less.

Referring now to FIG. 2, an auction example
25a is shown. An order entry participant 12 (FIG. 1),
50 35 e.g., a broker/dealer system 12a, for example, enters a

5 customer order 30 to sell a certain number of shares,
e.g., 500 shares of "XYZ" stock at the market. The order
30 is entered with an order type i.e., buy (B) or sell
(S), the number of shares, name of security and an
10 5 exposure time, e.g., 15 seconds and optional conditions.

The National Best Bid Offer 32 (NBBO) is received by
the automated auction system 20 for a price 125-125
1/16. The National Best Bid Offer price at this time is
15 only a starting reference price for the auction. In
10 this example, the auction has a maximum life span of 15
seconds. The entry of the order 30 starts the auction.

20 The auction ends, as soon as some response that meets
the minimum qualifications of the order is received
provided that the order is still actively exposed to the
15 crowd.

25 Responses in the auction system 20 can include
fixed price, relative price and predefined relative
indications. Responses can have a lifespan, but
preferably responses have no lifespan. That is, they
30 20 are either immediately matched or canceled. The
responses can be permitted to choose what types of
orders they respond to. For example, there are two
broad types of orders, public agency orders, e.g., a
35 retail customer, or institutional customer. The second
25 type is professional orders, e.g., professional traders
or broker dealers trading for their own account.

40 In the example of FIG. 2, if broker/dealer B
enters via a system 14a with a buy response 34 of a
fixed variety, at 125.03 for 500 shares of "XYZ" and
30 thereafter but within the exposure time, broker/dealer C
enters, via another system 14a, a buy response 36 of a
45 relative variety, at an NBBO +0.03 for 500 shares (which
is 125 the NBB + \$0.03 a price improvement), the
automated auction system 20 will execute the order
35 between broker/dealer A and broker/dealer B since

5 broker/dealer B's order met the qualifications of the
auction and it arrived first. This example illustrates
that if there are two responses to an order at the same
effective price (i.e., either fixed as was response 34
10 5 or relative to the NBBO, as was response 36) the
response first in time will be executed. In this
example, the second response of broker/dealer C is not
matched with the order for execution even if it was at a
15 higher price, because the first response of
10 broker/dealer C arrived first and satisfied the order in
its entirety.

20 If there was a portion of the order left over,
that is, the first broker/dealer's response 34 was for
less than the initial order, then the second
15 broker/dealer's response 36 would have a chance at any
remainder. In that case, they could both execute. If,
25 for a customer order to sell 800 shares of "XYZ" (not
shown), broker/dealer B's response 34 to buy would result
in a trade for 500 shares at broker/dealer B's price and
30 20 broker/dealer C's response 36 would result in the
remaining 300 shares at broker/dealer C's price which may
be different.

35 As soon as the terms and conditions are fully
met by a response, that response ends the auction. The
25 automated auction system 20 is active for a maximum time
of either the 15 seconds or 30 seconds that was chosen
at the time of order entry. The automated auction
40 system 20 also ends the auction for an order, if there
were no pre-defined indications and no response that
30 satisfied the order and any conditions attached to the
order and chosen exposure time. Thereafter, if the
45 order is not executed in the automated auction system
20, the order may be eligible for a market maker
guarantee or sent for execution outside of the system.
50 35 For example, the order may be entitled either a

5 guarantee or execution elsewhere, as will be described below. The automated auction system 20 will forward the executions to the exchange for validation, trade reporting and clearance.

10 5 Referring now to FIG. 3, a second auction example 25b is shown. In this example, a customer order 40 is entered for 600 shares of "XXY" to sell at the market, i.e., at the National Best Bid Offer NBBO 42 at the time of the order execution. The exposure time is 15 seconds. This example is illustrative of order entry where there are two pre-defined, relative indications.

20 In this auction example 25b, the customer order 40 will accept whatever the best bid is at the time the order 40 is entered. The customer places a 15 second lifetime on the order 40. Assume that the NBBO price 42 at the time the order is entered is 49-49 1/8, and that broker/dealer B and broker/dealer C had previously entered pre-defined relative indications to buy, 44, 46, respectively. These pre-defined relative 20 indications 44, 46 are responses that are entered into the auction system 20 prior to entry of an order. They are relative, meaning that they are relative to what the NBBO is at the moment they can be matched with an order.

35 A ranking process 105 that prioritizes received pre-defined relative indications by price improvement and time is described in FIG. 11.

40 In this example, broker/dealer B and broker/dealer C each have pre-defined relative indications which indicate that each would be willing to participate, as in the auction system 20, to an order which is presented at the relative price of the National Best Bid Offer and optionally some price improvement.

45 Since the customer is a seller, the relative price is the National Best Bid (NBB) and customer is willing to accept whatever that bid is. The broker/dealer B is 50

5 willing to pay just the NBB and broker/dealer C is
willing to pay the NBB + .05. Broker/dealer C's pre-
defined indication 46 is willing to improve the National
Best Bid (NBB) by 5 cents. If the quote was 49-49 1/8
10 5 at the time the order from the crowd came in,
broker/dealer B's response is based on a price of 49, the
best bid, broker/dealer C's relative response is 49 plus
\$0.05 for 1000 shares. Broker/dealer C had a pre-
15 defined relative indication 44 at a higher price than
20 broker/dealer B's pre-defined relative indication 44 and
therefore has higher priority. Broker/dealer C's pre-
defined relative indication 46 therefore satisfies the
order 40 and thus broker/dealer C buys the 600 shares at
49 plus \$0.05. Broker/dealer C is left with a remaining
15 pre-defined relative indication 46' (FIG. 4) for future
25 auctions of 400 shares. Broker/dealer B missed buying
because broker/dealer B's pre-defined relative indication
44 was for an inferior price than the pre-defined
relative indication 46 of broker/dealer C.

30 20 Broker/dealer B was only willing to pay the customer the
best bid, not the best bid plus \$0.05. The automated
auction system 20 will forward the executions to the
exchange for validation, trade reporting and clearance.

35 Referring now to FIG. 4, broker/dealer C has a
25 remaining pre-defined relative indication 46' for future
auctions of 400 shares. This pre-defined relative
indication 46' will still be available at the same
40 priority for future auctions. The auction process 20
includes two auction parameters that are set for all
30 pre-defined relative indications.

45 The two auction parameters are used to manage
exposure, but may also have the effect of governing the
relative position of the pre-defined relative
indications after exhaustion of one of the parameters,
50 35 and can completely exhaust the predefined relative

5 indication for the other parameter. These parameters
are used to give a participant an ability to manage
financial exposure. These parameters also guarantee
that no one participant or indication would maintain
10 5 preferential position in the auction. One parameter is
a maximum share amount per indication and the other is a
maximum share amount per auction.

15 If broker/dealer C has not exceeded the
maximum share amount per auction it can participate in
10 the current auction in which case its pre-defined
relative indication 46' will retain its time priority
and therefore can match with another order 40 for here
20 400 shares entered by broker/dealer A. If the maximum
share amount per auction for broker/dealer C's pre-
15 defined relative indication had been exhausted, then
that pre-defined relative indication 46' is lowered in
25 time priority to the end of a queue for that price
grouping. If the maximum share amount per indication
has been exhausted, then the pre-defined relative
30 20 indication 46' is extinguished completely.

A pre-defined relative indication, therefore,
is a willingness or an expression to trade that resides
in the system and remains dormant and unseen by other
35 participants. This mechanism also allows trading
25 interest to remain anonymous as to price, size and
identity. A pre-defined relative indication, when
activated, becomes a response that is priced relative to
40 the National Best Bid/offer (NBBO). The automated
auction system 20 will forward the executions to the
30 exchange for validation, trade reporting and clearance.

Referring now to FIG. 5, a fourth auction
45 example 25d is shown. In this example 25d, a customer
order 40' and condition 40a are entered to sell 600
shares of "XXY". The condition 40a is that the order
35 50 seeks a specific minimum price improvement of ".02".

5 Thus, the order is at the market (i.e., at the national
best bid NBB at the time of the order execution) plus a
minimum price improvement of 2 cents. The exposure time
is 15 seconds. The exposure does not reveal the 0.02
10 condition. This example is illustrative of a conditioned
order within the example of two pre-defined relative
indications.

15 In this auction example 25d, the customer
order 40' seeks specific minimum price improvement.

20 Broker/dealer B and broker/dealer C have each pre-
defined relative indications 44', 46'. Broker/dealer B's
pre-defined relative indication 44' improves the
National Best Bid (NBB) by 5 cents. If the quote was
49-49 1/8 at the time the order from the crowd came in,
25 broker/dealer B's indication 44' is based on a price of
49, the best bid, and thus broker B has a relative
response of 49 plus \$0.05 for 1000 shares. Because
broker/dealer B's pre-defined relative indication 44'
satisfies the order and all conditions of the order, the
30 order is matched with broker/dealer B response.
Broker/dealer B buys the 600 shares at 49 plus \$0.05.
Since broker/dealer B had a pre-defined indication 44
for a larger amount than the sell order of the customer,
35 the order is filled completely, and broker/dealer B is
left with a remaining pre-defined relative indication of
25 400 shares for future auctions. Broker/dealer C missed
buying because broker/dealer C's pre-defined relative
40 indication 46 was at a lower price than the pre-defined
relative indication 44 of broker/dealer B.
30 Broker/dealer C was only willing to pay the customer the
best bid, not the best bid plus \$0.05. The automated
45 auction system 20 will forward the executions to the
exchange for validation, trade reporting and clearance.

5 Referring now to FIG. 6, a fifth auction
example 25e is shown. Broker/dealer A enters a customer
order 50 to sell 700 shares of "YYY" at the market. The
order 50 has an exposure time of 15 seconds. Stock "YYY"
10 5 has an NBBO 52 of 92-92 5/16. Shortly after, another
order 58' to buy 500 shares of "YYY" at the market is
entered for another customer by broker/dealer D. Both
Broker/dealer B and C receive notification that an
15 auction to sell 700 shares of "YYY" has started. Only
20 broker/dealer C sends a response 56, subsequent to entry
of the customer order of broker/dealer D. The automated
auction system 20 executes the trade between the two
customer orders of Broker/dealer A and Broker/dealer D,
since the customer order of Broker/dealer D was entered
15 before Broker/dealer C responded. The order execution
price is the mid-point of the NBBO, i.e., the mid-point
of the spread, which in this example is 92 5/32. The
remainder of the order (200 shares) is executed with
Broker/dealer C at the NBBO. The automated auction
20 system 20 will forward the executions to the exchange
for validation, trade reporting and clearance.

Referring now to FIG. 7, in example 25f
broker/dealer A enters a customer order 60 to sell 700
35 shares of stock "YYY" at the market. The order 60 has an
exposure time of 15 seconds. The NBBO for "YYY" is 25-25
1/16. Both Broker/dealer B and C receive notification
that an auction to sell 700 shares of "YYY" has started.
40 Only broker/dealer C elects to respond 66 to buy only
500 shares.

30 The automated auction system 20 will execute
the order between Broker/dealer A and Broker/dealer C
for 500 shares at the NBBO. The remainder of the order
(i.e., 200 shares) remains active until the original 15
seconds elapses, at the end of which, if no other
35 offsetting orders are entered on the opposite side of

5 the market, and no other pre-defined relative
indications or responses come in, the order balance of
200 shares is eligible for a market maker guarantee if
it is a public order. That is, specially-designated
10 5 market makers will guarantee the execution of the order
at the NBB, thus buying 200 at the NBB existing at the
end of the exposure period, i.e., 25, if the market were
still 25-25 1/16. If there still remains a balance
15 after the end of the market maker guarantee, the balance
20 is delivered to the best available market for the stock
on other exchanges or markets unless requested
otherwise, as described more fully below at the end of
server process 100. The automated auction system 20
will forward the executions to the exchange for
15 validation, trade reporting, and clearance.

25 Referring now to FIG. 8, in example 25g
broker/dealer A is a market maker that trades with its
own customers. Broker/dealer A enters a customer order
70 to sell 900 shares of stock "ZZZ" at the market.
30 20 Broker/dealer A enters this order with a special
condition. There can be several special conditions.
Examples of special conditions include matching the
nominal price improvement of the crowd, sharing up to a
35 50 split, and block match trading. The Broker/dealer
25 determines the trade condition at order entry. Using
the price improvement match condition, that condition
allows broker/dealer A to trade with its customer unless
40 the crowd responds with more than a nominal price
improvement, e.g., better than NBBO + .02 cents.

30 In this example, the order 70 has an exposure
time of 30 seconds. The stock "ZZZ" has a NBBO 132-132
45 1/8. Both Broker/dealer B and C receive notification
that an auction to sell 900 shares of "ZZZ" has started.

Only broker/dealer C elects to respond, with a relative
50 35 response 76 of NBBO +0.01. The automated auction system

20 will execute the entire order between Broker/dealer A and Broker/dealer A's customer at NBBO + .01 cents because no crowd member provides more than the nominal price improvement e.g., 0.02.

If Broker/dealer's C response was for NBBO + .03 cents, the order would have been executed with broker/dealer C up to the size of broker/dealer C's response, since in this example, broker/dealer C would have provided more than nominal price improvement. The automated auction system 20 will forward the executions to the licensed exchange for validation, trade reporting, and clearance.

The 50% split trading condition allows the crowd to obtain up to a set percentage e.g., 50% of the order at various prices. If there is crowd interest beyond 50% of the order, the broker/dealer will trade at the prices of the crowd interest that is beyond 50% of the order, and for any balance beyond that the broker/dealer will trade at the NBBO. For block match trading, the broker/dealer specifies an amount that the broker/dealer would facilitate the block at after the crowd had an opportunity to respond up to some portion of the block, e.g., 20%. The broker/dealer would take the 20% of the block with the crowd having an opportunity for the balance. If there are no responses, the dealer takes 20% of the block and the balance is unexecuted. The unexecuted balance could execute outside of the system. If there is crowd interest, the crowd trades for portions of the block at various prices up to 80% of the block, and the broker/dealer trades for any remainder of the block. If there is crowd interest beyond 80%, the broker dealer trades at the price established by the crowd up to the crowd interest, i.e. the quantity specified by the crowd. Any balance will trade at the NBBO.

5 The broker/dealers can also act as principals,
i.e., act for their own account or as registered market
makers. A registered market maker is a type of
broker/dealer that has its own distribution network for
10 5 the receipt of orders. For instance, large brokerage
houses may have many branch offices and receive orders
from those branch offices. They can execute the orders
internally meaning that if they are a market maker on a
15 specific security, they will execute the trade
20 themselves instead of delivering the trade to an
exchange for exposure and/or interaction with others for
execution. The auction system 10 enables the order to
20 obtain the best price available regardless of whether
the broker/dealer entering it is acting as a registered
15 market maker or in a principal, riskless principal, or
agency capacity.

25 Referring now to FIG. 9A, an exemplary format
for an order entry 101 for the auction system 10 is
shown. The order entry 101 includes information 101a
30 20 entered by the order entry side of the auction. The
information can include a security symbol, an indication
of whether the order is to buy or sell, a quantity, an
exposure period, and price, either fixed, market or
35 conditions such as a price improvement relative to the
25 NBBO or other conditions all or none etc. The order
entry 101 is transmitted 101b to the auction system 20.
Orders with a fixed price may be treated differently
40 (executed immediately i.e., a zero second order or
canceled) depending on regulatory requirements.

30 Referring now to FIG. 9B, a format for a
response 114 is also shown. The response 113 includes
45 information 115a including a security symbol, a price or
a price improvement, a quantity of shares and a buy/sell
indication. The response information 115a is also
35 transmitted 115b to the auction system 20 and is placed

5 in a queue (not shown).

Referring now to FIG. 9C, a format for a pre-defined relative indication 107 is shown to include an information portion 107a which includes a security
10 5 symbol, a relative price improvement, a quantity and an indication type, either buy or sell. The information 107a is also transmitted 107b to the auction system 20. In the auction system 20 the pre-defined relative
15 indication is sorted 107c by type, e.g., buy or sell and
20 by price and time received.

Referring now to FIGS. 10A-10B, a server process 100 that may be executed on the auction system
20 20 is shown. The server process 100 receives an order 101 entered by the order side 12 of the system 10, via
15 the order entry format 101 (FIG. 10A). The process 100 exposes 104 the order to the crowd, i.e., potential
25 responders 14, via an electronic broadcast over the network systems mentioned above. The system 10 displays the size of the order and the order remains displayed
30 20 for the life span of the order or until an execution ends the auction. The process 100 compares 106 the order to any existing pre-defined relative indications, contra-side orders or responses (if responses are chosen
35 to have a lifetime as discussed below) that exist in the system 10 at order receipt.

If there are pre-defined relative indications or contra-side orders or responses (if responses have a
40 lifetime) in the system 10, the process 100 will attempt to match 108 those existing pre-defined relative
30 indications or contra-side orders or responses to the order. For predefined relative indications, the match
45 process 108 will examine the pre-defined relative indication that exists, at the best price and which is the oldest at that best price, and will determine
35 whether that pre-defined relative indication matches any

5 conditions that may exist with the order. The same
criteria could be applied to existing contra-side orders
or responses. If there is a match, the order will be
executed 110 with that pre-defined relative indication.

10 5 If there is not a match, the process can
iterate through a queue of pre-defined relative
indications, contra-side orders and responses to
15 determine the next oldest pre-defined relative
indications, contra-side orders and responses at that
20 best price to determine a match. The match process 108
attempts to find the pre-defined relative indications,
contra-side orders and responses with the best price
improvement or best price, as appropriate, and that is
15 the oldest in the auction system 20 at that price
improvement and which satisfies all conditions of the
25 order and validating constraints that may apply. For
example, if a price is specified outside of the NBBO it
may be matched by the system 20 but will not pass
30 validation. The system 20 can adjust the price so that
it falls at the NBBO at the time of the execution.

If there are no matching existing pre-defined
relative indications, contra side order or responses,
35 the process 100 will continually receive contra side
25 orders 101, responses 113, and newly arriving pre-
defined relative indications 107. The process 100 will
compare 112 contra side orders 101 to the current order.

40 If there is a match it will execute the order. If
there is no match the process 100 will determine if
30 responses or new pre-defined relative indications 107
match 118 the current order.

45 The compare for contra side orders and then
for responses or new predefined relative indications
implies some preference for contra side orders.
35 However, the process 100 could compare 112 contra side

5 orders, responses and new predefined relative indications to the current order using an age and/or price criteria.

If there is a match it will execute the order.

10 5 If there is no match the process 100 will determine if responses or new pre-defined relative indications 107 match 118 the current order. The process 100 will perform the compare and matches over a life span window that is determined by the exposure period specified 119
15 10 by the order entry 101. If the process 100 determines a match 116 or 118, the order will be executed 117.

20 Otherwise, the process 100 will continue to wait until the exposure time period 119 specified in the order 101 has elapsed 118. If the process 100 does not receive a
15 25 matching response within that time period, as shown in FIG. 10B, the process 100 will expire 124 the auction process for that order.

The process 100 will determine 122 whether there are other orders in the auction and, if there are
30 20 other auctions, will return to compare 106 the other received orders to the pre-defined relative indications and so forth to start a new auction. If the process 100 expires the order 119, the process 100 will also send
35 25 120 the expired order or any unexecuted portion of the order to a guarantee process and/or execution outside of the process 100.

An alternative arrangement to that shown above
40 could have the process 20 allow responses to have a lifespan coextensive with the lifespan of the auction
30 process. If the system 20 allows responses to have a lifespan, but if there are no other orders, the process
45 100 will expire (not shown) all remaining responses in the system 20.

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5 Another example would have the compare 106 and
match 108 performed only for predefined relative
indications. If there was not a match with a predefined
relative indication, the process 100 would iterate
10 5 through a queue of pre-defined relative indications to
determine the next oldest pre-defined relative
indication, at that best price to determine a match.
The match process 108 attempts to find the pre-defined
15 relative indication with the best price improvement, and
20 that is the oldest in the auction system 20 at that
price improvement and which satisfies all conditions of
the order and validating constraints that may apply.

20 A still further option could have the entry of
an order start an auction process at which time the
15 auction system 20 could collect all responses over the
25 exposure duration. The auction system would then sort
the received responses by some criteria that produces
the best response based on price and size.

Referring now to FIG. 10C, the expired order
30 20 or any remaining portion thereof is transmitted 120, if
qualified 123 for guaranteed execution 125, against
certain designated market makers who will be matched
with the order at the prevailing NBBO, up to the lesser
35 of an established threshold (e.g. 1099 shares and is a
25 public agency order) or the size associated with the
NBBO. If, after any match has occurred, an unexecuted
balance still remains 126, that order balance is
40 transmitted 128, (unless the customer has indicated
otherwise) to the market quoting the best price in that
30 stock, such market being another exchange or market that
trades the security and with which there is maintained a
45 link for delivering orders. For example, in the case of
an exchange-listed stock the link that would be used
currently is the Intermarket Trading System (ITS), or,
50 35 in the case of a Nasdaq stock, the link would be Small

Order Execution System (SOESSM) and/or SelectNetSM, or a successor system. Thus, at each stage of the process, from auction, through market maker guarantee, and then, if there is a balance, through to other market centers, the original order has an opportunity for price improvement, but in any case should always obtain the best prices publicly available in the marketplace as a whole.

Referring now to FIG. 11, a pre-defined indication ranking process 105 is shown for ranking pre-defined indications by price improvement and time received. The pre-defined indication ranking process 105 receives 130 a pre-defined relative indication and assigns 132 it a time stamp. The process determines 134 whether the pre-defined relative indication is for a buy or a sell. If the pre-defined relative indication is for a buy, the process 105 parses 136 the pre-defined relative indication to extract the price improvement "pi", as specified in the pre-defined relative indication. This price improvement "pi" is compared 138 to previously received price improvements "pi_q." The compare process 138 looks to find a previously received price improvement grouping that is equal to, greater than, or less than the current price improvement. If the process 105 finds a price grouping that is equal to a current price improvement "pi" the process 105 places 140 the received pre-defined relative indication at the end of that price improvement grouping. Otherwise, a new grouping at the highest, lowest, or at an intermediate price improvement level is produced for the received pre-defined relative indication.

The process 105 will perform a similar sorting process 105 including comparing 138' and placing the received pre-defined relative indication into a price improvement grouping if the received pre-defined

5 relative indication is determined 134 to be a sell
indication. After the process 105 sorts the received
pre-defined relative indication, it returns 144. The
process can keep track of the pre-defined relative
10 5 indication by use of a queue (not shown).

Referring now to FIG. 12, the match process
118 is shown. At the initiation of the auction, the
match process 118 retrieves 160 any response or new pre-
15 defined relative indication in the auction system 20.
20 The match process 116 determines if the retrieved new
pre-defined relative indication or a response matches
162 to the current order. If there is a match 166, the
match process 118 will tentatively execute 117 (FIG.
10A) the order with the matched response 113, or new
15 pre-defined relative indication 107 or newly arriving
contra side orders. If there is not a match, the match
25 process 118 will increment a pointer for example, to the
next oldest pre-defined relative indication or will
examine a new response. The match process 118 retrieves
30 20 160 the next oldest pre-defined relative indication and
will repeat the match process 118 to determine if the
retrieved pre-defined relative indication or a new
response matches 162 the order. If there is a match,
35 the match process 118 will execute 117 the order with
25 the matching response, pre-defined relative indication.
The match process 118 will continue until the lifetime
period has expired or until an order has been executed.

40 The match process 108 (FIG. 10A) matches
orders with pre-defined relative indications that pre-
30 existed at order entry. The match process 108 matches
first on the basis of best price and then on the basis
45 of oldest pre-defined relative indication at the best
price. On the other hand, the match process 118 matches
against active responses, and subsequently received pre-
50 35 defined relative indications by the oldest that meets

the terms of the order.

Other Embodiments

It is to be understood that while the invention has been described in conjunction with the detailed description thereof, the foregoing description is intended to illustrate and not limit the scope of the invention, which is defined by the scope of the appended claims. Other aspects, advantages, and modifications are within the scope of the following claims. For example the auction process can be used with other products such as goods, commodities, works of art, etc.

It is especially suitable for items that have a value that can change over time in accordance with fluctuations in market conditions.

What is claimed is:

Claims

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CLAIMS

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1. A method of auctioning products, said method
5 executed over a distributed networked computer system,
said method comprising:

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entering an order for a product, the order
specifying a price which can be a relative price, a
market price or a fixed price, and specifying a quantity
10 and an exposure time;

20

entering a response to an order, the response
specifying a price, which can be a relative, fixed price
or a relative price with a price improvement, and
quantity; and

25

15 matching the order with the response in
accordance with the exposure time specified by the
order.

30

2. The method of claim 1 wherein a plurality of
20 orders and responses are entered, and wherein matching
further comprises:

35

matching a first one of the orders with the
responses during the exposure time interval specified by
the order.

25

40

3. The method of claim 1 wherein a plurality of
orders and responses are entered, and wherein matching
further comprises:

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collecting all responses during the exposure
30 interval, and matching a first one of the orders to an
optimal one of the responses that is determined in
accordance with price and quantity specified in the
optimal one of the responses.

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- 5 4. The method of claim 1 wherein the products are
financial instruments.
- 10 5. The method of claim 1 wherein matching
5 retrieves an oldest response and determines whether the
oldest response includes a price that satisfies a price
specified by the order.
- 15 6. The method of claim 1 further comprising:
10 expiring the order if the exposure time
specified by the order has elapsed and no matching
response was received.
- 20 7. The method of claim 1 further comprising:
15 entering pre-defined relative indications that
25 correspond to a willingness to buy or sell the product;
and
 wherein the pre-defined relative indications
specify a price relative to a current market price.
- 30 8. The method of claim 7 wherein the pre-defined
20 relative indications specify a quantity of the product.
- 35 9. The method of claim 1 wherein entering orders
25 further comprises:
 specifying a product.
- 40 10. The method of claim 1 wherein entering
responses further comprises:
30 specifying a product.
- 45 11. The method of claim 7 wherein matching further
comprises:
 retrieving an oldest response, other order, or
35 pre-defined relative indication and determining whether
- 50

5 the oldest response, other order, or pre-defined
relative indication satisfies the order.

10 12. The method of claim 7 wherein retrieving
5 further comprising:
matching pre-defined relative indications to
the order with the pre-defined relative indications
ranked by price and within a price ranking by time.

15 13. The method of claim 12 further comprising:
expiring the order if the exposure time
specified by the order has elapsed and no matching
20 response, other order, or pre-defined relative
indication was received.

25 14. A method of auctioning financial products over
a distributed, networked computer system, said method
comprising:

30 entering orders for financial products into
20 the distributed, networked computer system, said orders
specifying a price for the financial product, a quantity
of the financial product and exposure time which the
order can remain active;

35 entering responses to orders for the product,
25 said responses specifying a price and quantity; and for
a first one of said orders,

40 matching said first order, to the responses
and contra-side orders, during an interval determined by
the exposure time specified by said first order; and

45 30 expiring the first one of the orders if no
matching responses or contra-side orders are received
during the exposure period.

50 15. The method of claim 14 further comprising:
35 executing a trade between the first order and

5 one of the contra-side orders or responses that matched
the first order.

10 16. The method of claim 15 wherein executing a
5 trade further comprises:
reporting the first order and the matched one
of the contra-side orders or responses to a facility of
a self-regulatory organization for market validation.

15 17. The method of claim 14 wherein the orders can
10 further include conditions attached to the order.

20 18. The method of claim 17 wherein the conditions
can include a price improvement.

15 19. The method of claim 14 wherein entering
25 further includes entering pre-defined relative
indications.

30 20. The method of claim 19 wherein entering pre-
defined relative indications can occur before or after
an order is entered.

35 21. The method of claim 14 wherein the process
25 determines whether a match price falls outside of a
spread specified for the product.

40 22. The method of claim 14 wherein for trading by
a broker dealer, the system allows the broker/dealer to
30 specify specific trading options when the broker dealer
is trading with its own customer.

45 23. The method of claim 14 wherein an expired
order is sent for a guarantee execution by a market
50 maker or for execution on a market or an exchange.

5

24. A computer program product for auctioning products, said computer program product residing on a computer readable medium comprising instructions for causing a computer to:

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receive an order that was entered for a product, the order specifying price, quantity and exposure time;

15

receive a response that was entered in response to an order, the response specifying a price, price improvement, and quantity; and

20

match the order with the response during the exposure time specified by the order.

25

25. The computer program product of claim 24 wherein the products which are auctioned are products that have a value that changes with market conditions.

30

26. The computer program product of claim 24 wherein instructions that cause the computer to match further comprise instructions that cause the computer to:

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retrieve an oldest response and determine whether the oldest response includes a price that satisfies a price specified by the order.

40

27. The computer program product of claim 24 further comprising instructions that cause a computer to:

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expire the order if the exposure time specified by the order has elapsed and no response that matched the order was received.

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28. The computer program product of claim 24 further comprising instructions that cause the computer

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to:

receive pre-defined relative indications that correspond to a willingness to buy or sell the product, with the pre-defined relative indications specifying a price relative to a current market price.

29. The computer program product of claim 25 wherein the pre-defined relative indications specify a quantity.

30. The computer program product of claim 24 wherein orders specify a product.

31. The computer program product of claim 24 wherein responses specify a product.

32. The computer program product of claim 24 wherein instructions that cause the computer to match further comprise instructions that cause a computer to: retrieve an oldest response, contra-side order, or pre-defined relative indication and determine whether the oldest response, contra-side order, or pre-defined relative indication satisfies the order.

33. A system for auctioning financial products over a distributed, networked computer system, said system comprising:

a plurality of workstations for entering orders for financial products into the distributed, networked computer system, said orders specifying a price for the financial product, a quantity of the financial product and exposure time which the order can remain active;

a plurality of workstations for entering

5 responses to orders for the product, said responses
specifying a price and quantity;

10 a server computer coupled to the workstations
for entering the orders and the responses, said server
5 computer executing a server process that for a first one
of said orders,

15 determines a match to said first order
with the responses and contra-side orders during an
interval determined by the exposure time specified by
10 said first order.

20 34. The system of claim 33 wherein the server
process

25 executes a trade between the first order and
15 one of the other orders or responses that matched the
first order.

30 35. The system of claim 34 wherein the server
process executes a trade and reports the first order and
20 the one of the contra-side orders or responses that
matched the first order to a facility of a self-
regulatory organization for market validation.

35 36. The system of claim 35 wherein the orders can
25 further include conditions attached to the order.

40 37. The system of claim 36 wherein the conditions
can include a price improvement.

30 38. The system of claim 33 wherein the response
workstations can enter pre-defined relative indications
45 that can exist in the system before an auction for the
product has started.

50 35

5 39. The system of claim 33 wherein the response
workstations can enter pre-defined relative indications
after an order was entered.

10 5 40. A system for auctioning financial products
over a distributed, networked computer system comprises:
 a plurality of workstations for entering
orders for financial products into the distributed,
15 networked computer system, the orders specify a price
20 for the financial product, a quantity of the financial
product and exposure time which the order can remain
active;

 a plurality of workstations for entering
predefined relative indications and responses to orders
25 for the product, the predefined relative indications
specifying a willingness to trade, the responses
specifying a price and quantity; and

 a server computer coupled to the workstations
for entering the orders, predefined relative
30 indications, and the responses, with the server computer
executing a server process, said server process
comprising software to:

 determine a match to a first order with
35 the predefined relative indications, responses and
25 contra- side orders during an interval determined by
the exposure time specified by said first order.

40 41. A method of auctioning a product, said method
comprising:

30 entering a pre-defined relative indication
that corresponds to a willingness to buy or sell the
45 product with the pre-defined relative indication
specifying a price relative to a current market price.

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- 5 42. The method of claim 41 the predefined relative
indication allows trading interest to remain anonymous
as to price, size and identity until matched with an
order.
- 10 5 43. The method of claim 41 wherein said method is
executed over a distributed networked computer system.
- 15 44. The method of claim 43, further comprising:
10 entering an order for a product, the order
specifying a price which can be a relative price, a
market price or a fixed price, and specifying a
20 quantity.
- 15 45. The method of claim 44 further comprising:
25 matching the order with the predefined
relative indication in accordance with the exposure time
specified by the order.
- 30 20 46. The method of claim 43 further comprising:
matching the order with the predefined
relative indication in accordance with the exposure time
specified by the order and in accordance with a time of
35 receipt of the predefined relative indication.
- 25 47. The method of claim 43 wherein the order
specifies an exposure time.
- 40 48. The method of claim 43 further comprising:
30 entering a response to an order, the response
specifying a price, which can be a relative or fixed
45 price or a contra-side order that may have a condition
seeking a relative price improvement, and quantity.

- 5 49. The method of claim 48 wherein a plurality of
orders, predefined relative indications and responses
are entered, and wherein matching further comprises:
 matching a first one of the orders with one or
10 5 more of the predefined relative indications or responses
during the exposure time interval specified by the
order.
- 15 50. The method of claim 49 wherein matching
20 further comprises:
 collecting all predefined relative indications
and responses during the exposure interval, and matching
20 a first one of the orders to an optimal one of the
responses that is determined in accordance with price
15 and quantity specified in the optimal one of the
responses.
- 25 51. The method of claim 43 wherein the products
are financial instruments.
- 30 52. The method of claim 43 wherein the pre-defined
relative indication specifies a quantity of the product.
- 35 53. The method of claim 43 wherein a plurality of
25 predefined relative indications are entered and said
method further comprises:
 ranking the predefined relative indications by
40 price and within a price ranking by time.
- 30 54. The method of claim 53 wherein matching
further comprises:
45 matching at least one pre-defined relative
indication to the order.

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5 55. A method of auctioning securities comprises:
entering an order for a security, the order
specifying a condition that seeks a specific minimum
relative price improvement and an exposure time;
10 5 entering a response to the order, the response
specifying a price, which can be a relative or fixed
price or a contra-side order that may have a condition
seeking a relative price improvement, and quantity; and
15 matching the order with the response in
20 accordance with the exposure time specified by the
order.

20 56. The method of claim 55 wherein the order with
the condition is exposed to the market for the exposure
15 time and wherein the exposure does not reveal the
condition.

25 57. The method of claim 55 wherein the order with
the condition specified the price improvement relative
30 20 to the national best bid/offer (NBBO).

35 58. The method of claim 55 wherein the order can
include other conditions including executing all of the
order or none of the order.

40 25 59. A computer program product residing on a
computer readable medium for auctioning a product,
comprising instructions for causing a computer:
store a pre-defined relative indication that
corresponds to a willingness to buy or sell the product
30 with the pre-defined relative indication specifying a
price relative to a current market price;
45 receive an order for a product, the order
specifying a price which can be a relative price, a
market price or a fixed price, and specifying a
50 35 quantity; and

5 match the order with the predefined relative
indication in accordance with a price specified by the
order.

10 5 60. The computer program product of claim 59
further comprising instructions to cause a computer to:
match the order with the predefined relative
15 indication in accordance with an exposure time specified
by the order and in accordance with a time of receipt of
10 the predefined relative indication.

20 61. The computer program product of claim 59
wherein computer program further comprises instructions
to cause a computer to:
15 cause the predefined relative indication to
remain anonymous as to price, size and identity until
25 matched with an order.

30 62. The method of claim 59 wherein instructions to
20 match further comprise instructions to:
collect all predefined relative indications
and responses during the exposure interval; and
match a first one of the orders to an optimal
35 one of the responses that is determined in accordance
25 with price and quantity specified in the optimal one of
the responses.

40 63. The method of claim 59 wherein the products
are financial instruments.

30 64. A computer program product method of
45 auctioning securities comprises instructions to cause a
computer to:
receive an order for a security, the order
35 specifying a condition that seeks a specific minimum

5 relative price improvement and an exposure time;
 receive a response to the order, the response
 specifying a price, which can be a relative or fixed
 price or a contra-side order that may have a condition
10 5 seeking a relative price improvement, and quantity; and
 match the order with the response in
 accordance with the exposure time specified by the
 order.

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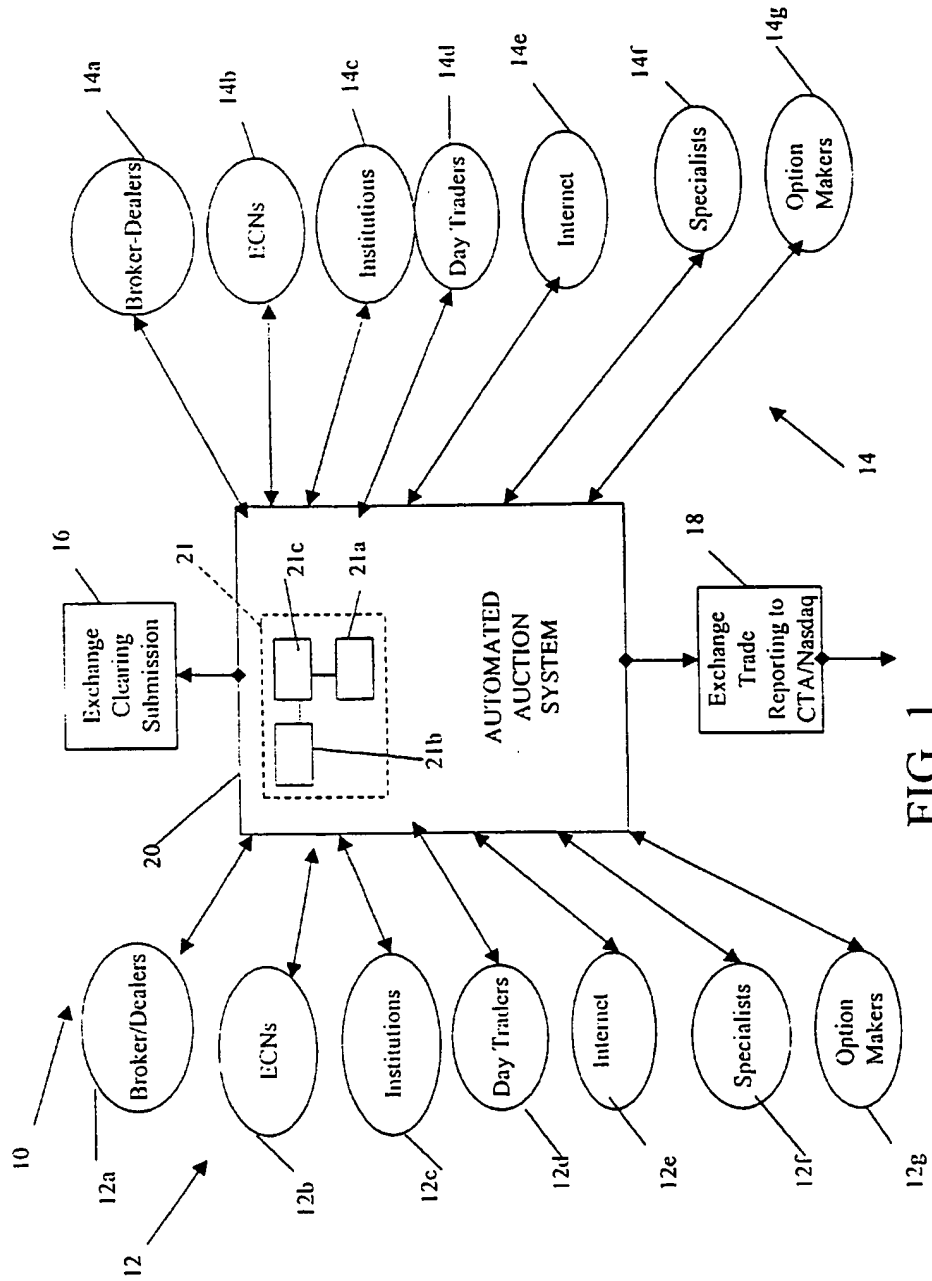


FIG. 1

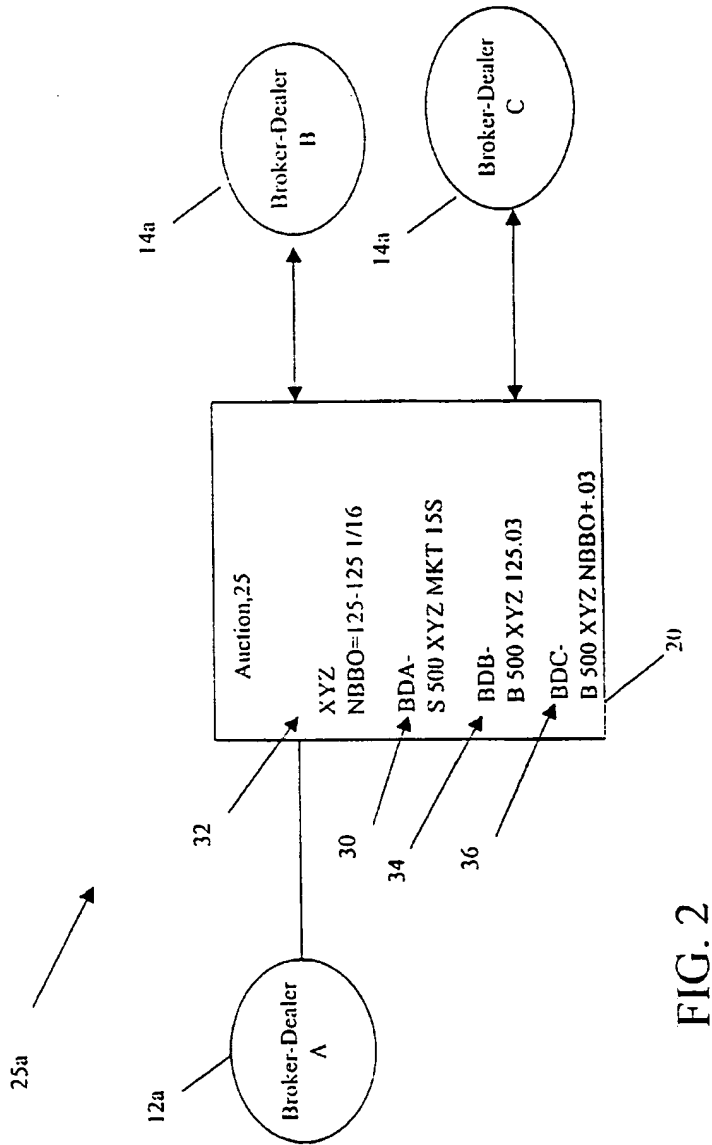


FIG. 2

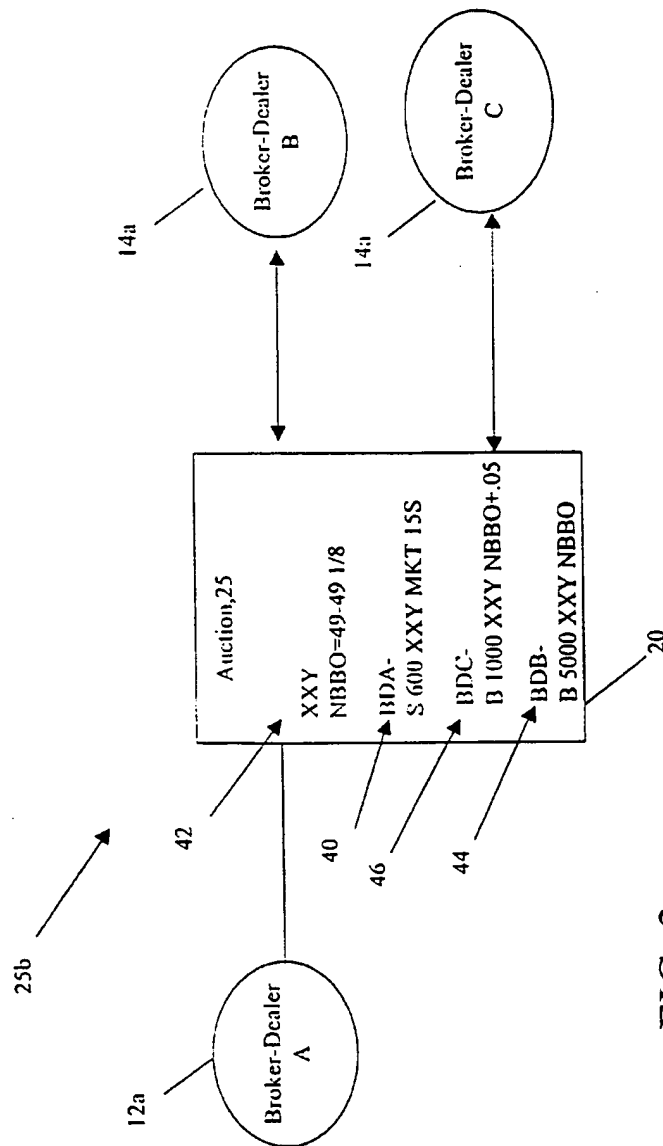


FIG. 3

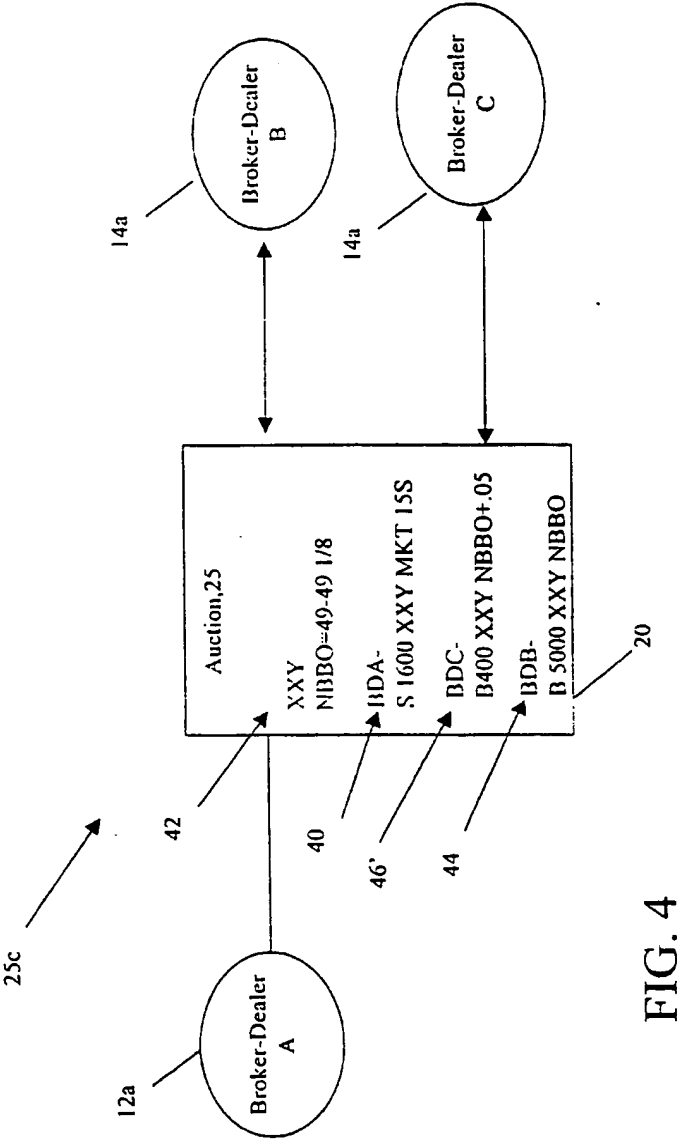


FIG. 4

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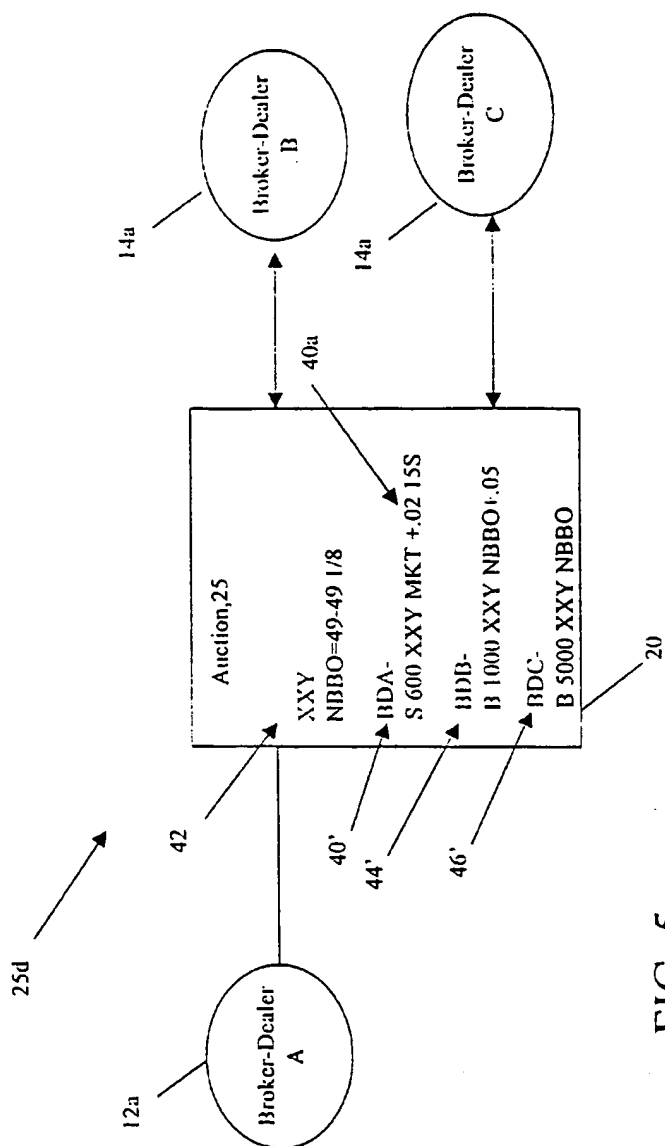


FIG. 5

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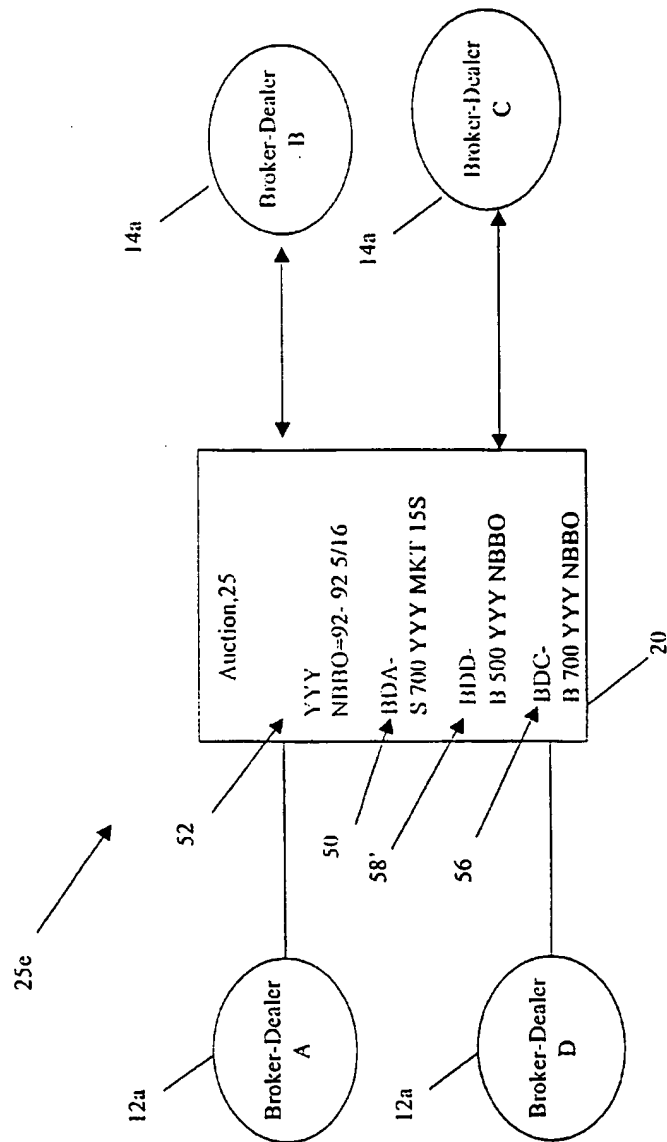


FIG. 6

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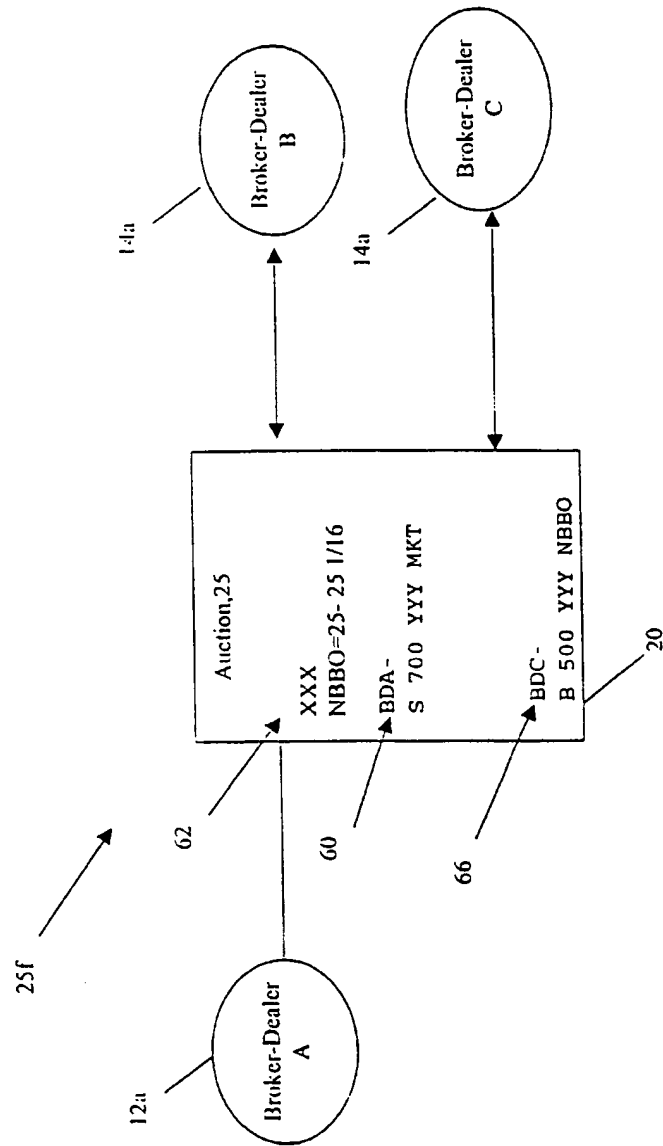


FIG. 7

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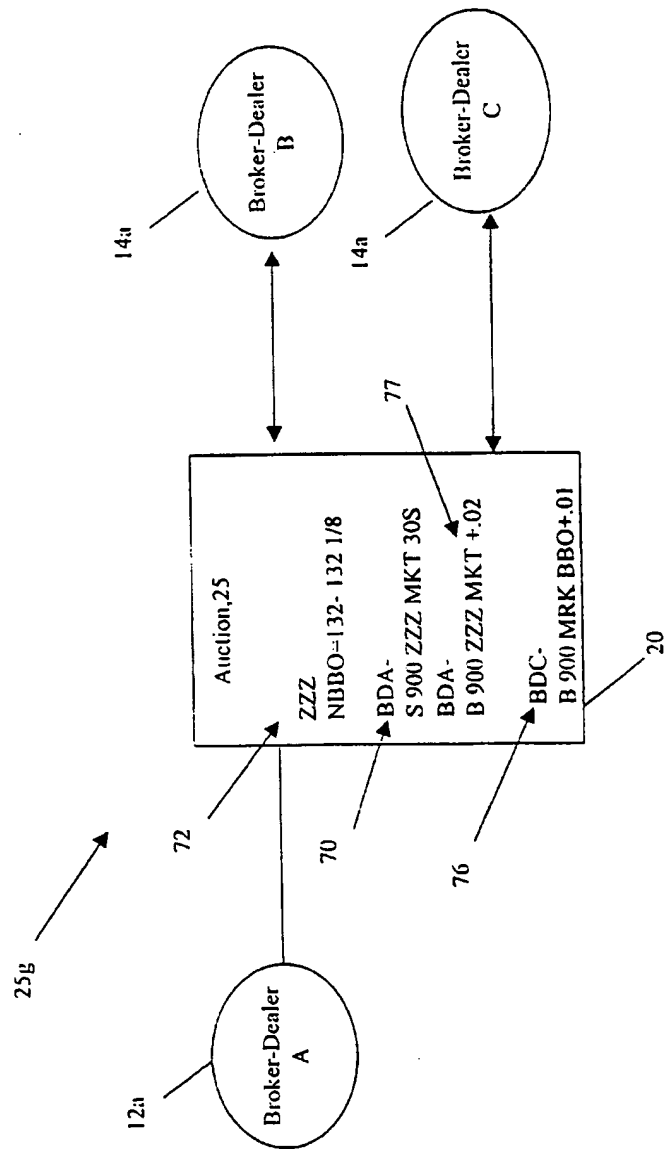


FIG. 8

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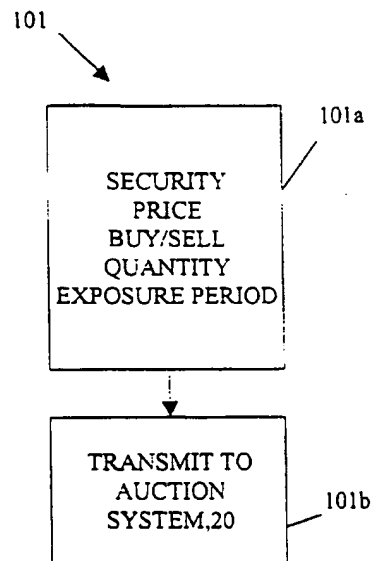


FIG. 9A

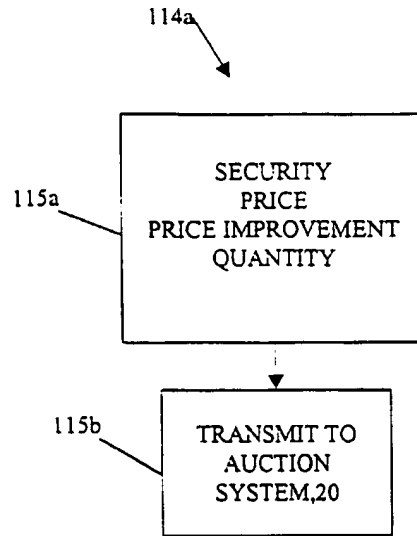


FIG. 9B

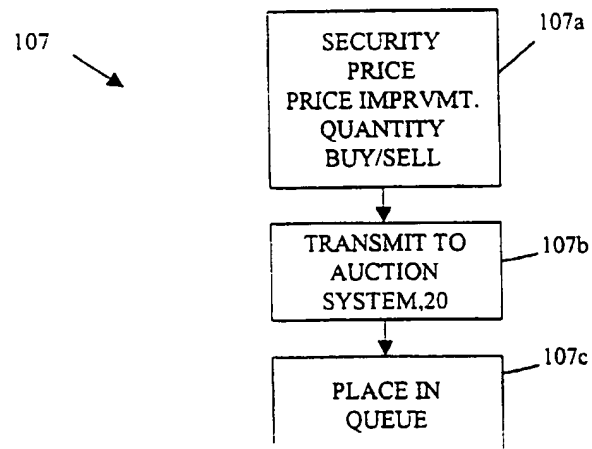
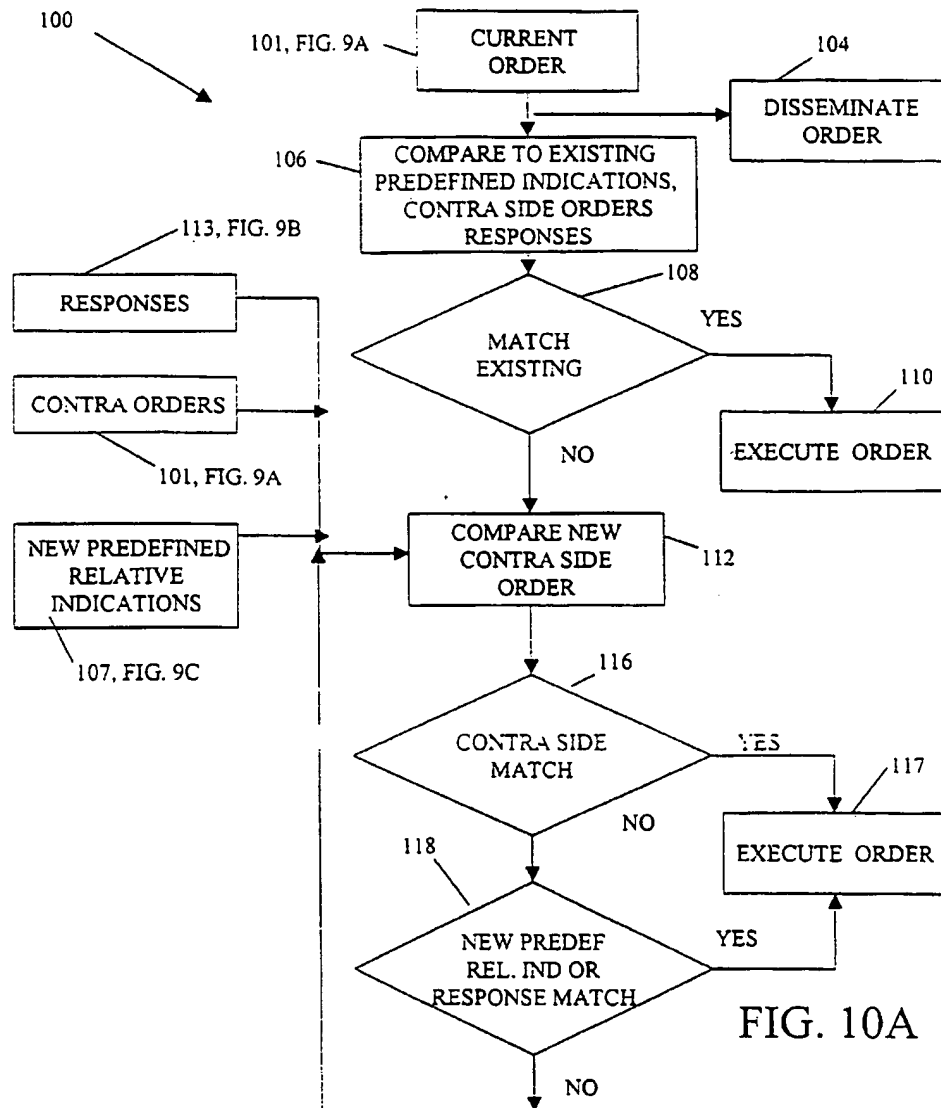


FIG. 9C

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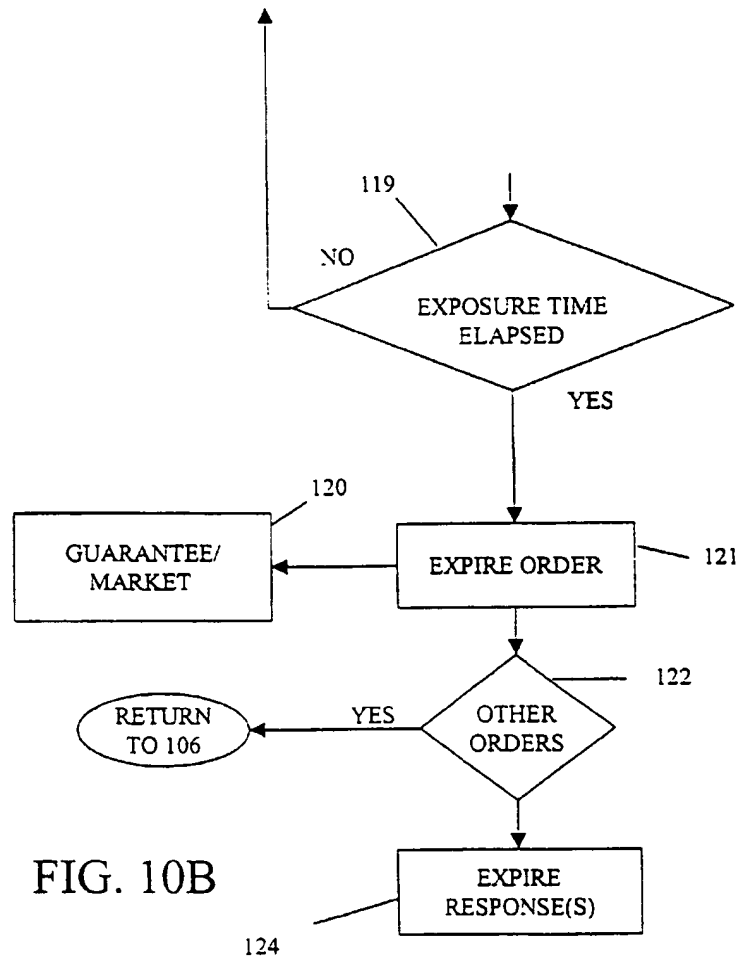


FIG. 10B

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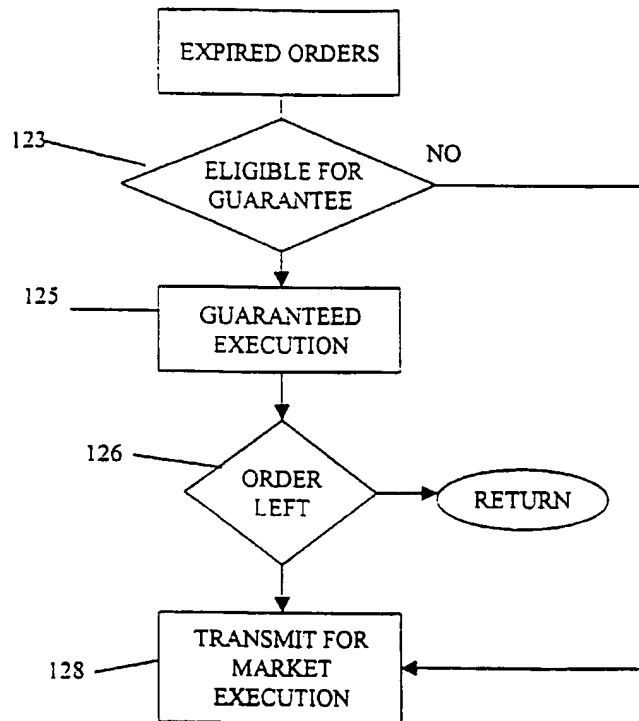


FIG. 10C

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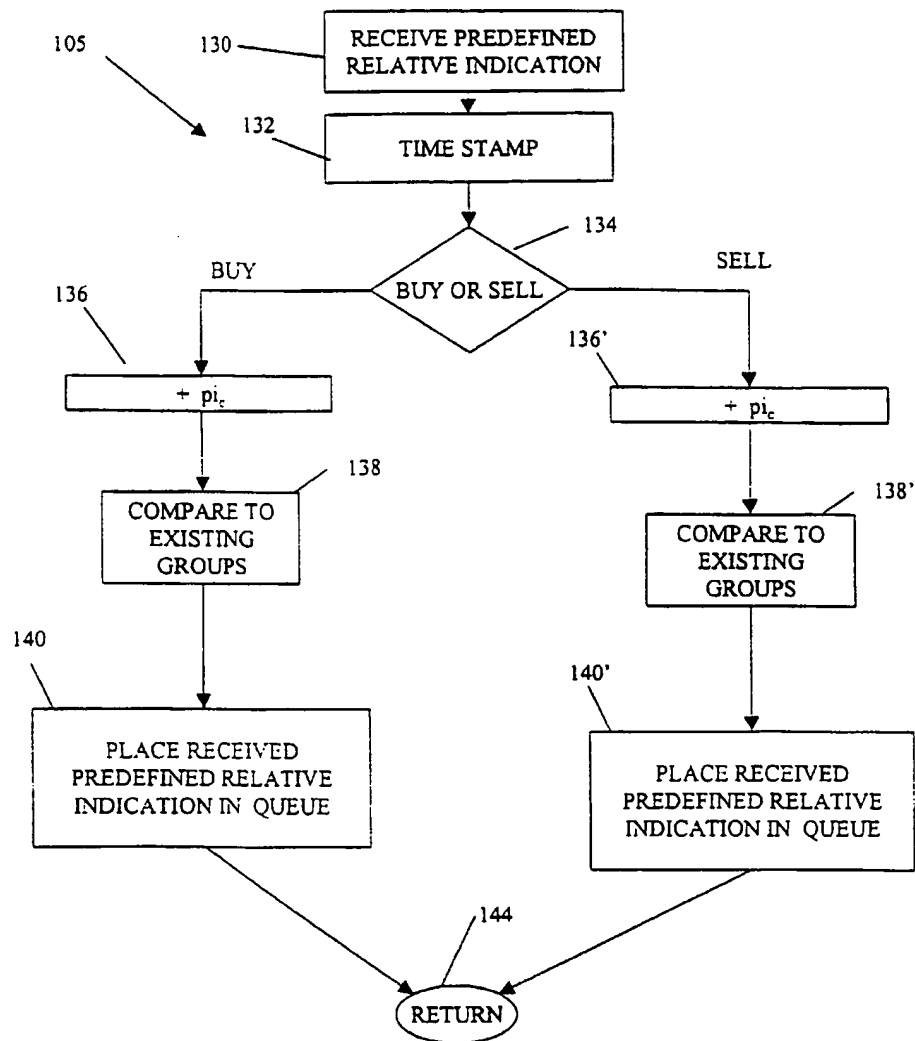


FIG. 11

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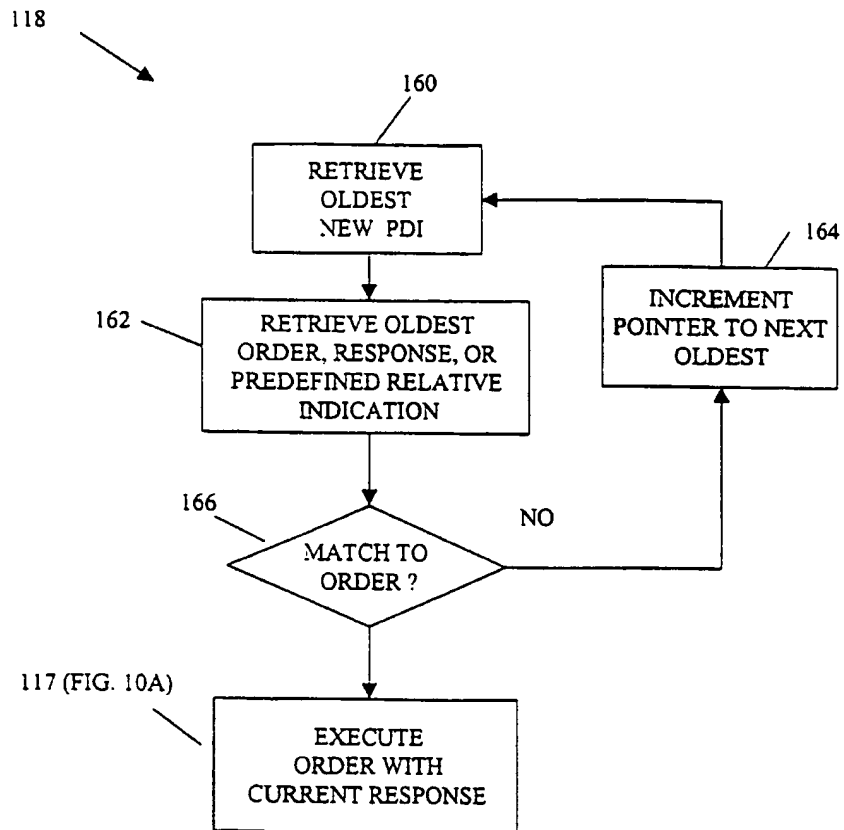


FIG. 12

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/07157

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G06F 17/30

US CL : 705/26, 37, 42

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 705/26, 37, 42

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

Please See Extra Sheet.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X — Y	US 4,903,201 A (WAGNER) 20 February 1990 (20.2.90), Fig. 5, 8, col. 1, lines 10-14, col. 3, lines 43-52, col. 5, lines 38-55, col. 7, lines 12-14, col. 10, lines 19-67, col. 12, lines 29-31, col. 13, lines 39-62, col. 6, lines 44-62.	1-2, 4-22, 24-41, 43-49, 51-55, 57-64 ----- 3, 21, 23, 42, 56, 50
Y	US 5,845,266 A (LUPIEN) 01 December 1998 (1.12.98), Fig. 11, col. 23, lines 59-64.	3, 21, 50
Y	US 5,136,501 A (SILVERMAN et al.) 04 August 1992 (4.8.92), col. 3, lines 39-47, col. 6, lines 44-47, col. 7, 24-25.	23, 42, 56
A	US 4,412,287 A (BRADDOCK, III) 25 October 1983 (25.10.83), Entire Document.	1-64

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
A document defining the general state of the art which is not considered to be of particular relevance	*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
E earlier document published on or after the international filing date	*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
L document which may throw doubt on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*G* document member of the same patent family
O document referring to an oral disclosure, use, exhibition or other means	
P document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

09 JUNE 2000

Date of mailing of the international search report

10 JUL 2000

Name and mailing address of the ISA/US
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/07157

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3,581,072 A (NYMEYER) 25 May 1971 (25.5.71), Entire Document.	1-64
A, P	US 6,014,643 A (MINTON) 11 January 2000 (11.1.00), Entire Document.	1-64
A, P	US 5,926,801 A (MATSUBARA et al.) 20 July 1999 (20.7.99), Entire Document.	1-64
A	Intelligent Electronic Markets for Commodity Auction: An Integrated Approach of Economic Theory and Social Choice Theory, Dissertation Abstracts International, Abstract. 1993	1, 14, 24, 33, 40, 41, 55, 59, 64
A	A Revolution in Securities Markets' Structures, Financial Market Trends, n65, pa15(19), November 1996	1-64

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/07157

B. FIELDS SEARCHED

Electronic data bases consulted (Name of data base and where practicable terms used):

Dialog

search terms: financial transaction, purchase, buy, request, trade, exchange, commodity, asset, bond, future, security, financial instrument, stock, option, auction, sale, match, associate, correlate, determine, predetermined, conditional, market value, contra side order, execute, price, increase, improve, bid, sell, equity.